DOCUMENT RESUME

ED 196 207 EC 131 334

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TITLE Relating the Capabilities of the Handicapped to the Human Attribute Requirements of Jobs: User's Guide.
INSTITUTION Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
PUB DATE 79
GRANT G007603970
NOTE 113p.; For related documents, see EC 131 335-336.

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Disabilities; *Employment; Job Skills; *Prevocational Education; Secondary Education; *Student Characteristics; Student Evaluation; Vocational Adjustment

ABSTRACT

The guide is intended to provide educators and potential employers of the handicapped with information on career preparation for the handicapped. The self instructional format is explained to focus on the process of developing work relevant human attributes required for job performance and then relating these requirements to the capabilities of handicapped persons. The guide includes sample instrumentation, illustrations, examples, and analysis from three occupations (general secretary, automotive mechanic, and business data programmer). Guidelines are offered for preparing occupational statements, identifying attribute requirements, selecting survey instrument respondents, developing occupation by attribute and job activity by attribute survey instruments, and developing attribute by exceptionality survey instruments. (CL)

User's Guide

RELATING THE CAPABILITIES OF THE HANDICAPPED TO THE HUMAN ATTRIBUTE REQUIREMENTS OF JOBS

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May, 1979

The Materials in this publication were prepared pursuant to a contract with the Bureau of the Education for the Handicapped, U. S. Office of Education, U. S. Department of Health, Education and Welfare. Grantees undertaking such projects under government sponsorship are encouraged to freely express their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official Bureau of Education for the Handicapped, U. S. Office of Education position or policy.

G007603970

U. S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE

U. S. OFFICE OF EDUCATION
BUREAU OF THE EDUCATION FOR THE HANDICAPPED

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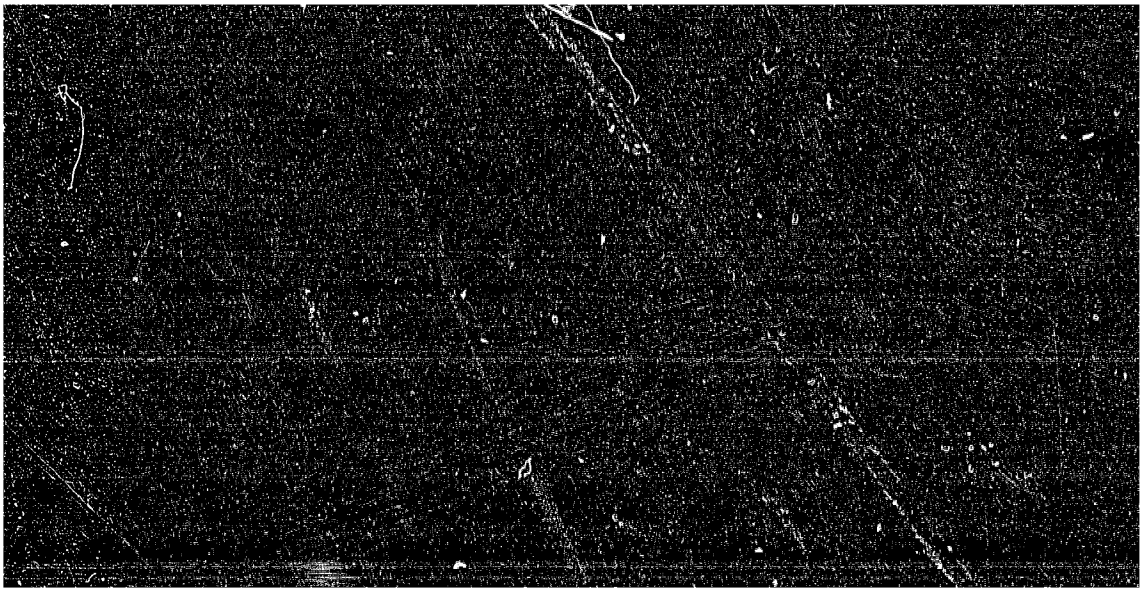
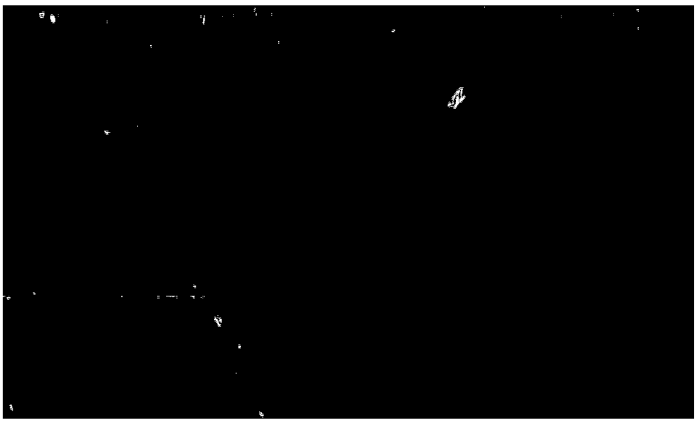
FOREWORD

Maximizing career opportunities and job satisfaction of handicapped persons involves a careful linkage of career preparation, counseling, and job placement. Although research and development efforts have made strides toward identifying, describing, and assessing individual handicaps and capabilities, there has been a research void in the development of ways to identify and describe relevant behavioral requirements of jobs for the handicapped and to relate their requirements to the capabilities, preparation, and employment of handicapped persons.

One effort undertaken to alleviate the discrepancy between the lack of knowledge on the part of educational personnel and employers about human characteristics or attributes required for performance on specific jobs and the capabilities of the handicapped person is this User's Guide. Its intent is to identify, describe, and illustrate the capabilities of the handicapped to demonstrate the human attribute requirements of jobs. The guide includes sample instrumentation, illustrations and examples from three diverse occupations, and guidelines for (1) generating task lists for jobs, (2) selecting work relevant attributes, (3) identifying appropriate survey respondents, (4) designing surveys, (5) analyzing and interpreting job information, and (6) constructing attribute requirements for jobs and attribute development profiles for handicapped persons.





PREFACE

This is a *User's Guide* designed for use by guidance and counseling personnel, employers and personnel directors, as well as curriculum and instructional personnel working with the handicapped. Its objectives are to provide educational personnel and potential employers serving the handicapped with the skills and a knowledge base for providing career preparation information and extending opportunities information to handicapped persons.

This guide was developed by the National Center for Research in Vocational Education, Special Projects Division, pursuant to a grant from the U. S. Office of Education, Bureau of Education for the Handicapped to illustrate procedures to be used when relating the capabilities of the handicapped to the human attribute requirements of jobs. For purposes of illustration, only three occupations were used. Their selection was predicated on the availability of task inventories developed previously at the National Center for Research in Vocational Education. The three occupations used represented three diverse fields and included survey respondents from three occupations - general secretary, automotive mechanic, and business data programmer.

A number of organizations have contributed to the field testing of data contained in this guide relative to the occupations surveyed. Special appreciation is extended to those

LIST OF FIGURES

INTRODUCTION

Purpose and Design of the Guide

The primary purpose of this guide is to serve as a resource to persons concerned with identifying, describing, and assessing the individual capabilities of handicapped persons and relating these capabilities to actual job requirements. This guide has been designed for self-instructional use. It enables the user to better understand the *process* of developing work relevant human attributes required for job performance, and relating these requirements to the capabilities of handicapped persons.

The content and format of the guide have been designed to accommodate many different levels of understanding and informational needs on the part of curriculum developers for the handicapped, vocational and special education instructors, counselors, and employers concerning human characteristics or attributes required for acceptable performance of specific jobs and the capabilities of handicapped persons to develop the capacity to perform various jobs. Profiles of the human attribute requirements of the major tasks actually performed on a job, together with descriptions of the present capabilities of handicapped individuals and those capabilities which could be acquired or developed over time, can be used to help direct attentions to potential job options that may be pursued realistically and illustrate work opportunities for which they are qualified. In order to illustrate the aforementioned, the guide includes: sample instrumentation, illustrations, examples, analysis from three diverse occupations, and guidelines for (1) generating task lists; (2) selecting work relevant attributes; (3) iden-

tifying appropriate survey respondents; (4) designing surveys; (5) analyzing and interpreting job information; (6) constructing attribute requirement profiles for jobs, and (7) constructing attribute development profiles for handicapped persons. The design of the guide has been developed to include all procedures necessary to replicate this study and all procedures necessary to further develop task inventories and profiles for occupations and tasks within the occupations for handicapped individuals in systematic and simplistic form.

Audiences and Development of the Guide

This guide is directed at several primary audiences and includes but is not limited to:

- *guidance and counseling personnel*
- *curriculum planners and developers*
- *vocational educators*
- *vocational educators*
- *employers and personnel directors*
- *special educators*
- *rehabilitation counselors*
- *rehabilitation specialists*

This guide should help promote interaction and communication among curriculum developers, guidance and counseling personnel, vocational educators, special educators, rehabilitation personnel, and personnel directors and employers in improved long range articulation of pre-employment training, work-study programs, and on-the-job training for handicapped individuals.

Research and development procedures utilized in this study evolved from consideration of three major objectives. They are as follows:

(a) *Development of procedures to identify and portray the patterns of human attributes required for job performance*

(b) *Identification of the potential development of work relevant human attributes for handicapped persons*

(c) *Application of the procedures in three diverse occupations to assess the use and relative merit of this type of procedure for the handicapped*

The first objective, development of procedures for identification of the human attributes required for job performance by workers, resulted in a set of procedures for use by agencies and personnel serving the need for guidance, placement, and instruction of the handicapped. Human attribute profiles for each of the key job activities of the occupations selected for study were produced through application of the procedures.

The second objective, identification of the potential development of work-relevant human attributes for handicapped persons, was intended to yield estimates of the potential level of development of the handicapped which might provide benchmark information useful in individual counseling for career preparation and potential employment of the handicapped.

The third objective, application and assessment of the procedures, provided initial estimates of the relative merits and usefulness of the work attribute information for educational and employment decision making through use of simulation techniques and activities.

Topics Covered

The overall purpose of this guide is to serve as a resource reference to persons concerned with researching the guidance and placement needs of the handicapped. The guide covers the following topics:

- *Guidelines for identifying key job activities*
- *Guidelines for identifying key attributes*
- *Sample instrumentation*
- *Illustration and profiles of three diverse occupations (Automotive Mechanic, General Secretary and Business Data Programmer)*
- *Profiles of key task by key attributes across the three occupations*
- *Profiles of the attributes of the handicapped person used in the procedures*
- *Sources of information useful in developing attribute profiles for use by personnel working with the handicapped*

The guide includes sections covering these topics in addition to the introductory material. Each section is self-contained, which allows for concentration on the particular section most relevant to the user's needs. Section I, *Preparing Occupational Statements*, is intended to provide a comprehensive approach to developing and writing occupational task statements. Section II, *Identifying Attribute Requirements*, identifies the method used in determining human attribute requirements of jobs and a sample of the questionnaire used in the methodology.

Section III, *Selecting Survey Instruments Respondents*, suggests approaches for identifying sample populations for completing *Occupation-by-Attribute, Job Activity-by-Attribute*, and *Survey Instruments*. Section IV, *Developing Occupation-by-Attribute* and *Job Activity-by-Attribute Survey Instruments* presents information concerning construction of these two instruments and provides an illustration of both instruments. Section V, *Developing Attribute-by-Exceptionality Survey Instruments*, illustrates the two approaches for obtaining information, from handicapped individuals and those who work with the handicapped, on the capabilities of exceptional individuals to demonstrate the thirty-eight attribute requirements. Section VI, *Data Analysis and Developing Profiles*, suggests appropriate methods for analyzing the survey instruments and developing profiles from these data. This section also provides an illustration of the three profiles for the *Job Activity-by-Attribute, Occupation-by-Attribute,* and *Attribute-by-Exceptionality Survey Instruments* using transparencies. Section VII, *Summary and Conclusion*, provides further information for identified target audiences including guidance and counseling, employer and personnel directors, and curriculum and instructional personnel for using the data collected in the profiling section. Section VIII, *Recommendations for Profiling Handicapped Individuals*, provides information concerning the use and selection of appropriate survey assessment instruments for handicapped populations.

Limitations of the Guide

This guide contains only one approach to relating the capabilities of the handicapped to the human attribute requirements of jobs and provides profile analysis for only three occupations. The identification of key attributes may not be acceptable to all guide users, but these attributes have been subjected to empirical assessment and have been found to be the "most acceptable".

The *User's Guide* cannot be viewed as a panacea for the myriad of problems faced by the handicapped and personnel working with the handicapped toward job procurement. Rather it provides a method for expediting this process.

Finally, the analysis of the profiles for the handicapped population is limited by the extremely small sample size. However, the purpose of the profiling procedure was to describe a procedure, not to define limits of the handicapped individual. Therefore, a small sample size in this context is acceptable.

The procedures at this stage cannot be considered final. Efforts will be exerted to include other methodologies and profiling techniques that could be considered applicable for the handicapped.

PREPARING OCCUPATIONAL STATEMENTS

The first procedure used to relate the capabilities of the handicapped to the human attribute requirements of jobs was to develop occupational statements. The Dictionary of Occupational Titles (DOT), published by the Department of Labor, revised edition, 1978 is the most comprehensive and accessible source providing job descriptions and lists of major tasks (job activities). The Dictionary of Occupational Titles contains a complete and comprehensive description of well over 25,000 separate occupational titles with as many as 1,000 cross reference titles. For example, just considering the occupation of automotive mechanic (auto. serv.) 620.281, five different entries are noted, including: automobile repair person, automobile service mechanic, garage person, garage mechanic, and garage repair person. All of these listings would be found under the title of "automotive mechanic" but as defined by the Dictionary of Occupational Titles, all relate to the same function. For additional cross references to this occupation, the reader is referred to Volume II of the Dictionary of Occupational Titles.

Once the occupation has been identified and selected from the Dictionary of Occupational Titles, it is then necessary to transform the narrative concerning the occupation, which is written in paragraphic form, to conform to standard task inventory structure. An illustration of this procedure is provided in Figure 1 for the occupation of automotive mechanic.

Figure 1

DICTIONARY OF OCCUPATIONAL TITLES -
PARAGRAPHIC FORM FOR THE OCCUPATION OF AUTOMOTIVE MECHANIC

AUTOMOTIVE MECHANIC (auto. serv.) 620.281, automobile repairman; automobile-service mechanic; garage man; garage mechanic; garage repairman. Repairs and overhauls automobiles; buses, trucks, and other automotive vehicles; examines vehicle and discusses with customer or AUTOMOBILE-REPAIR-SERVICE SALESMAN; AUTOMOBILE TESTER; or BUS INSPECTOR nature and extent of damage or malfunction. Plans work procedure, using charts, technical manuals, and experience. Raises vehicle, using hydraulic jack or hoist, to gain access to mechanical units bolted to underside of vehicle. Removes unit, such as engine, transmission, or differential, using wrenches and hoist. Disassembles unit and inspects parts for wear, using micrometers, calipers, and thickness gauges. Repairs or replaces parts such as pistons, rods, gears, valves, and bearings, using mechanic's handtools. Overhauls or replaces carburetor, blowers, generators, distributors, starters, and pumps. Rebuilds parts, such as crankshafts and cylinder blocks, using lathes, shapers, drill presses, and welding equipment. Rewires ignition system, lights, and instrument panel. Relines and adjusts brakes, aligns front end, repairs or replaces shock absorbers, and solders leaks in radiator. Mends damaged body and fenders by hammering out or filling in dents and welding broken parts. Replaces and adjusts headlights, and installs and repairs accessories, such as radios, heaters, mirrors, and windshield wipers. May be designated according to specialty as AUTOMOBILE MECHANIC, MOTOR; BUS MECHANIC, DIFFERENTIAL REPAIRMAN; ENGINE-REPAIR MECHANIC, BUS; FOREIGN-CAR MECHANIC; TRUCK MECHANIC. See volume II for additional titles.

As illustrated, the occupation of automotive mechanic was extracted exactly as written from the Dictionary of Occupational Titles. In order to conform to standard task inventory format to develop questionnaires, job activity statements must be rewritten in present tense, third person. All sentences containing negative verbs must be rewritten to conform to present tense eliminating the negative. For example, suppose one of the job activities under the automotive mechanic read:

> May or may not remove unit, such as engine, transmission, or differential, using wrenches and hoist.

This statement would be rewritten to read,

> Remove unit, such as engine, transmission, or differential, using wrenches and hoist.

Basically, seventeen job activities can be developed from the occupation of automotive mechanic as illustrated in Figure 2.

Figure 2

JOB ACTIVITY STATEMENTS IN STANDARD TASK INVENTORY SENTENCE STRUCTURE FOR THE OCCUPATION OF AUTOMOTIVE MECHANIC

- Examine vehicle and discuss with customer or automobile-repair-service salesman, automobile tester, etc., nature and extent of damage or malfunction.
- Plan work procedure, using charts, technical manuals, and experience.
- Raise vehicle, using hydraulic jack or hoist, to gain access to mechanical units bolted to underside of vehicle.

Figure 2 (Cont'd)

- Remove unit, such as engine, transmission, or differential, using wrenches and hoist.
- Disassemble unit, and inspect parts for wear using micrometers, caliper, and thickness gauges.
- Repair parts such as pistons, rods, gears, valves, and bearings using mechanic's hand-tools.
- Overhaul carburetors, blowers, generators, distributors, starters, and pumps.
- Replace carburetors, blowers, generators, distributors, starters and pumps.
- Rebuild parts, such as crankshafts and cylinders blocks, using lathes, shapers, drill presses, and welding equipment.
- Rewire ignition system, lights, and instrument panel.
- Reline and adjust brakes.
- Align front end.
- Repair or replace shock absorbers.
- Solder leaks in radiator.
- Mend damaged body and fenders by hammering out or filling in dents and welding broken parts.
- Replace and adjust headlights.
- Install accessories, such as radios, heaters, mirrors, and windshield wipers.

As seen in Figure 2, all of the specific activities listed within the occupation of automotive mechanic, Figurel, were rewritten to form one simple task statement. In other words, it may be necessary to make one complete task statement from complex or compound sentences

contained in a Dictionary of Occupational Titles listing. Basically, the same procedure can be followed for any occupation listed in the Dictionary of Occupational Titles. Task or activity statements written in an inventory format becomes the basis for developing the field test instrument.

IDENTIFYING ATTRIBUTE REQUIREMENTS

An attribute, within this methodology, has been defined as any quality or characteristic that can be ascribed to a person. It was within this context that attribute statements were selected and organized into three categorical areas: *Cognitive Abilities, Psychomotor Abilities, and Sensory Capacities.*[1] Each broad categorical heading has been defined as follows.

> A. COGNITIVE ATTRIBUTES
>
> The qualities of knowing; including both awareness and judgment involving perceiving, recognizing, remembering, conceiving, reasoning, thinking creatively, etc. A general characteristic of cognitive attributes is a relatively high state of consciousness or awareness of one's behavior.

Twenty attributes were developed under this category which demonstrated a relationship to the cognitive processes.

> B. PSYCHOMOTOR ATTRIBUTES
>
> Characteristics involving bodily or muscular movements, usually in coordination with the sensory processes.

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[1] Six categories appeared in the original Attribute Requirement Inventory developed by Neeb, Cunningham, and Tuttle, Center for Occupational Education, North Carolina State University. However, three categories, *General Vocational Capabilities, Interests, and Needs* were deleted since these categories could be considered something other than human characteristics.

Twelve attributes were developed under this category which showed a relationship to the psychomotor processes.

C. SENSORY CAPACITY ATTRIBUTES

Characteristics involving the use of sense organs.

Six attributes were developed under this category which showed a relationship to the sensory capacities.

For purposes of this methodology, each of the thirty-eight attributes were operationalized within the following definitions indicated in Figure 3.

FIGURE 3

ATTRIBUTE DEFINITIONS AND EXAMPLES

COGNITIVE ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
1. Closure	organize a disorganized or an obscure visual field into a single impression, with or without knowledge of any of the specific forms contained in the field.	example structure/patterns using an instrument; inspect or investigate shapes/designs for background detail.

COGNITIVE ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
2. Form Perception	identify relevant details in objects or in graphic material; make fine visual comparisons; and discriminate among characteristics such as shapes and shadings of figures or objects and widths and lengths of lines.	paint designs on surfaces; compare finite objects for similarities and differences.
3. Perceptual Speed	rapidly identify details in verbal or tabular material and rapidly perform simple visual discrimination tasks; discriminate between symbols, detecting differences in copy, etc.	check a proof against the original copy; transpose information from printed matter into a machine.
4. Spatial Scanning	identify or detect objects quickly from a wide or complicated visual field.	look for objects on a large visual surface; identify numbers ending in five in a table, quickly
5. Spatial Orientation	identify area patterns and orient oneself in relation to the position and form of surrounding objects.	conduct a tour; drive an automobile.
6. Visualization	identify area patterns in two or three dimensions and convert them into other area patterns; demonstrate the ability to visualize objects of two or three dimensions; and analyze outlines in geometric forms.	use a mirror to visualize and manipulate objects; sketch design for a pattern.

COGNITIVE ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
7. Number Facility	calculate numberical results rapidly and accurately using operations, such as addition, subtraction, multiplication, and division; count; plot on numbered coordinates; etc.	compute scale representations of objects; add and subtract debits and credits; compute the answer to an arithmetic problem.
8. Memory	reproduce/recall pertinent learned information perfectly within a specified period of time (one minute to eight hours).	give a speech from memory; re-remember dispated addresses.
9. Verbal Comprehension	define the meanings of words and the ideas associated with them, and use them effectively; interpret language, identify relationships between words, and deduce meanings of whole sentences and paragraphs.	review written communication; prepare correspondence; write an article; prepare a presentation.
10. Grammar	utilize forms and structures of words and their general arrangement in phrases and sentences.	check a manuscript; read printed material for accuracy/correctness.
11. Spelling	use letters proprely to form words; distinguish between correctly spelled and misspelled words.	check typed material; read printed material for accuracy/correctness; prepare a paper.

COGNITIVE ATTRIBUTES

Attribute	Attribute definition	Examples of Attribute Activities
12. Expressional Fluency	translate ideas into words rapidly, especially in oral or written exchange. Expressional fluency differs from ideational fluency (below) in that expressional fluency does not involve coming up with ideas (as does ideational fluency) but, rather, the verbal expression of these ideas.	question an individual; respond to questions rapidly; write a report.
13. Ideational Fluency	express creative ideas rapidly about a given topic where quantity rather than quality of ideas is stressed (for example, producing as many ideas as possible about a given topic in five minutes).	throw out ideas for consideration; give suggestions for a new mailing strategy; suggest style changes in products/good.
14. Sensitivity to Problems	identify practical problems (example; improvements that could be made in electrical appliances); deficiencies in courses of action or organizational plans (example; why a road should be repaved when it would have to be torn up in the near future to install new sewer pipes); or recognize implications of activities (example; if the activity is building a dog house, the ability to infer that the entrance must be large enough to accommodate the dog, etc.).	anticipate problems that could arise on a trip; investigate decreasing production of products/goods.

COGNITIVE ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
15. Deductive Reasoning	examine given premises and reason those premises to their necessary conclusion. (Example; given: "All holidays are paid and no Sundays are paid", the ability to deduce that "No Sundays are holidays".)	solve a complex problem; solve an arithmetic/mathematical problem.
16. Inductive Reasoning	identify/express/write general concepts (giving structure and meaning to the information) from given specific sets of information; that is, produce a general concept, principle or rule to explain a set of specific instances. This factor is tested for by requiring the examinee to derive a principle from a number of particular instances. (Example; given the nonsense syllables ABC, MNO, XYZ, PQS, GHI, to discover that PQS is different from the others, since the rule for the formation of the others is alphabetical order.) Note basic differences and relationships among symbols, figures, and figure patterns (usually measured through the use of figure diagrams arranged according to some principle).	decode a secret message; develop a theory to explain research findings.

COGNITIVE ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
17. Originality	produce/express responses or ideas which are either clever or uncommon. Example; produce clever titles to story plots or produce novel consequences of a hypothetical situation (such as what if everyone were blind).	think of unusual names for products; produce a new title for a program; think of novel ways to make money.
18. Social Intelligence	identify/examine/interpret correctly behavioral information obtained through friendly interaction; identify the behavioral indicators of attention, thoughts, desires, moods, emotions, intentions, etc. (behaviors as gestures, postures, actions, expressions, voice inflections, etc.).	work with senior citizens; vary selling approach according to customer reaction; supervise subordinates.
19. Aesthetic Judgment	analyze/determine the compositional organization of art objects on the basis of considering differences in unit, proportion, form, color, and design.	assess the quality of a design; determine the value of antique artifacts.
20. Musical Aptitude	combine sensory, psychomotor, and cognitive capabilities necessary to produce musical expression (with voice or instrument). These capacities include using the sense of pitch, rhythm, time, and tonal memory.	keep in tune/time with musical notes; play a melody on a musical instrument; sing a song in a choral group.

PSYCHOMOTOR ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
21. Control Precision	adjust the position of a control mechanism (such as joysticks, levers, pedals, rudders, etc.) using rapid, precise, controlled muscular movement.	place in position a building section; operate a lever to control movement of a vehicle.
22. Multilimb Coordination	use more than one limb (both hands, both feet, or hands and feet) simultaneously, in coordinated manner.	operate manual components of instruments; participate in (recreational activities) active sports.
23. Reaction Time	respond rapidly to a stimulus when it appears.	correlate movements with time, quickly; avoid a falling object.
24. Eye-Hand Coordination	make rapid and accurate hand movements in coordination with visual stimuli. This attribute is tested by requiring the examinee to place dots in small circles as rapidly as possible.	assemble assorted designs into a construct; connect parts into an apparatus; lay a foundation.
25. Manual Dexterity	make rapid and accurate arm-hand movements in manipulating fairly large objects.	wrap packages; adjust appliances/ apparatus; manipulate parts.
26. Finger Dexterity	manipulate precisely small objects with the fingers.	manipulate small/fine parts; assemble intricate parts.

PSCYCHOMOTOR ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
27. Arm-Hand Steadiness	make precise arm-hand movements and maintain steadiness while making these movements, where strength and speed are unimportant. Also, minimize movement while the arms and hands are in a set position.	paint a design; fire at an object; transfer matter from one container to another container.
28. Explosive Strength	apply a maximum amount of muscular force through one or more short bursts of effort.	thrust objects with force; drive an object into the ground.
29. Static Strength	exert considerable force against external objects for a brief period, as in lifting, pushing, pulling, squeezing, carrying, etc.	transport materials from one place to another; unload goods from a conveyor.
30. Dynamic Strength	exert force repeatedly or continuously over time so as to move or support the body. Muscular endurance and resistance to muscular fatigue are important in this attribute.	emplace screws using hand tools; perform strenuous exercises.
31. Body Equilibrium	maintain or regain body balance and orientation when balance is threatened or temporarily lost, placing primary reliance on nonvisual cues (example; sensory cues).	paint from a ladder; walk a straight line; climb a tree; walk across one end of a room to the other end.

PSYCHOMOTOR ATTRIBUTES

Attribute	Attribute Definition	Examples of Attribute Activities
32. Stamina	exert the body through continuous effort over an extended period of time (heart endurance).	perform physical exertion for a prolonged/extended period of time.

SENSORY CAPACITIES

Attribute	Attribute Definition	Examples of Attribute Activities
33. Near Visual Acuity	identify and discriminate visual detail at normal reading distance or less.	proofread written materials; carve small objects; make a cut in a solid object.
34. Far Visual Acuity	identify/examine/specify details at distances beyond normal reading distance.	search for materials in a maze from a distance; read house numbers from a distance (while moving materials from one place to another); watch for pedestrians.
35. Depth Perception	determine and discriminate distances such as those determined from the observer along the observer's line of vision, from the front to the back of an object so that it is seen three dimensionally, etc.	move an object with a larger mechanical device; approach a car within a safe distance.

SENSORY CAPACITIES

Attribute	Attribute Definition	Examples of Attribute Activities
36. Color Discrimination	identify and distinguish color and similarities or differences among colors; identify harmonious or contrasting color combinations, or match colors adequately.	choose color schemes; mix shades of paint.
37. Auditory Acuity	identify relevant sound cues and discriminate between sounds in terms of their intensity, pitch or tonal quality.	listen for different sounds; take messages over the telephone; tune instruments.
38. Tactual Discrimination	identify and discriminate among characteristics of objects (such as size, shape, texture, etc.) through the use of touch.	examine an object by feeling for defects; model a small artifact.

SELECTING SURVEY INSTRUMENTS RESPONDENTS

Survey instruments respondents should include workers and those individuals who supervise these workers in order to provide a greater diversity in obtaining perceptions from individuals concerning their jobs and the human attributes required to perform their jobs. The following criteria could be used in selecting survey participants:

a. The organizations, agencies, or businesses should be in operation for at least two years.

b. Respondents should represent a cross-section of the same type of organizations, agencies or businesses. For example, several organizations, agencies, or businesses should be selected which employ various types of welders.

c. Respondents should be capable of completing the survey instruments within one week.

d. Respondents should be selected who represent a diversity of experience within the same type of occupation.

e. Respondents should represent a balance between workers and those who supervise workers within the same occupation.

f. Selected organizations, agencies, or businesses should represent a diversity of occupations within the single entity.

g. Respondents selected should be willing to complete both the *Occupation-by-Attribute Survey Instrument* and the *Job Activity-by-Attribute Survey Instrument*.

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The criteria listed are only suggested guidelines to follow in identifying and selecting the survey instrument respondents.

Although no ideal sample size is recommended, the overall number of survey instrument participants for both instruments should not exceed twenty. The ratio of supervisors to workers should be one to three. Once selected and identified, survey instrument participants should be informed as to the purpose of the survey, which is to provide needed information to counselors, teachers, and others so they can assist handicapped individuals in determining their occupational plans or anticipating employment requirements and preparation.

DEVELOPING OCCUPATION-BY-ATTRIBUTE AND JOB ACTIVITY-BY-ATTRIBUTE SURVEY INSTRUMENTS

Two instruments were developed for use in obtaining information from knowledgeable and skilled workers and supervisors within a given occupation and include an *Occupation-by-Attribute Survey Instrument* and *Job Activity-by-Attribute Instrument*. The *Occupation-by-Attribute Survey Instrument* contains the listing of the thirty-eight attributes as indicated in the section covering "Preparing Occupational Statements". This instrument is illustrated in Figure 4.

As indicated, each of the thirty-eight attributes is listed with a set of numbers 0 to 7 following This instrument is used to rate the importance of and need for each of the thirty-eight attributes to a given occupation. The *Occupation-by-Attribute Survey Instrument* is concerned only with the degree to which demonstration of an attribute is important to a given occupation and is not concerned with specific job activities within the occupation . The complete survey instrument booklet for the occupation of automotive mechanics is contained in Appendix A.

The *Job Activity-by-Attribute Survey Instrument* is concerned with assessing the degree to which demonstration of a particular attribute is important to specified job activities of a given occupation. An illustration of the *Job Activity-by-Attribute*

Survey Instrument similar to the *Occupation-by-Attribute Survey Instrument* is provided in Figure 5.

Note: The 0 - 7 scale provides eight levels of degrees to which demonstration of an attribute is required to perform a respective occupation or job activity within the occupation. 0 designates not required and 7 designates that demonstration of this attribute is required to a very high degree. The numbers 1, 2, 3, 4, 5, and 6 provide levels of degrees to which demonstration of an attribute is required to perform a respective occupation of job activity within the occupation between the two extremes 0 and 7.

Again, each of the thirty-eight attributes is listed with the same set of numbers 0 to 7, following each. However, in this instrument, consideration is given to rating each job activity within the occupation. The complete survey instrument is contained in Appendix B for the occupation of automotive mechanic, and is provided for illustration purposes only. Overall administration of the *Occupation-by-Attribute Survey Instrument* takes approximately thirty to forty-five minutes depending on the particular respondents. The first fifteen minutes should be spent becoming familar with the definition of the attribute contained in the definition booklet. The *Job Activity-by-Attribute Survey Instrument* taken approximately one hour to one hour and thirty minutes depending on the number of activity statements within the occupation. It is not necessary to complete both survey instruments within the same time frame, but both instruments should be completed within one week. If survey instruments are mailed to survey respondents, a letter of explanation should accompany the instruments.

This same procedure can be used when developing any type of occupational survey instrument. Separate survey booklets should be constructed for the *Occupation-by-Attribute Survey Instrument* and the *Job Activity-by-Attribute Survey Instrument*. Each survey instrument should be accompanied by a definition booklet containing the definitions of the human attribute requirements of jobs with examples of each attribute. The definition booklet is contained in Appendix C.

Figure 4

Occupation-by-Attribute Survey Instrument

Sample Occupation: Box Builder

Rating Scale
To perform this occupation, demonstration of this attribute is

0 Not Required
1 Required to a very minimal degree
2 Required to a minimal degree
3 Required to a low moderate degree
4 Required to a moderate degree
5 Required to a high moderate degree
6 Required to a high degree
7 Required to a very high degree

ATTRIBUTES	RATING
A. Cognitive Attributes	
1. Closure	0 1 2 3 4 5 6 7
2. Form perception	0 1 2 3 4 5 6 7
3. Perceptual speed	0 1 2 3 4 5 6 7
4. Spatial scanning	0 1 2 3 4 5 6 7
5. Spatial orientation	0 1 2 3 4 5 6 7
6. Visualization	0 1 2 3 4 5 6 7
7. Number facility	0 1 2 3 4 5 6 7
8. Memory	0 1 2 3 4 5 6 7
9. Verbal comprehnsion	0 1 2 3 4 5 6 7
10. Grammar	0 1 2 3 4 5 6 7
11. Spelling	0 1 2 3 4 5 6 7
12. Expressional fluency	0 1 2 3 4 5 6 7
13. Ideational fluency	0 1 2 3 4 5 6 7
14. Sensitivity to problems	0 1 2 3 4 5 6 7
15. Deductive reasoning	0 1 2 3 4 5 6 7
16. Inductive reasoning	0 1 2 3 4 5 6 7
17. Originality	0 1 2 3 4 5 6 7
18. Social intelligence	0 1 2 3 4 5 6 7
19. Aesthetic judgment	0 1 2 3 4 5 6 7
20. Musical aptitude	0 1 2 3 4 5 6 7
B. Psychomotor Attributes	
21. Control precision	0 1 2 3 4 5 6 7
22. Multilimb coordination	0 1 2 3 4 5 6 7
23. Reaction time	0 1 2 3 4 5 6 7
24. Eye-hand coordination	0 1 2 3 4 5 6 7
25. Manual dexterity	0 1 2 3 4 5 6 7
26. Finger dexterity	0 1 2 3 4 5 6 7
27. Arm-hand steadiness	0 1 2 3 4 5 6 7
28. Explosive strength	0 1 2 3 4 5 6 7
29. Static strength	0 1 2 3 4 5 6 7
30. Dynamic strength	0 1 2 3 4 5 6 7
31. Body equilibrium	0 1 2 3 4 5 6 7
32. Stamina	0 1 2 3 4 5 6 7
C. Sensory Capacity Attributes	
33. Near visual acuity	0 1 2 3 4 5 6 7
34. Far visual acuity	0 1 2 3 4 5 6 7
35. Depth perception	0 1 2 3 4 5 6 7
36. Color discrimination	0 1 2 3 4 5 6 7
37. Auditory acuity	0 1 2 3 4 5 6 7
38. Tactual discrimi-	0 1 2 3 4 5 6 7

Figure 5

Job Activity-by-Attribute Survey Instrument

Sample Occupation: Box Builder

Job Activity: Replace and adjust nuts and bolts.

Rating Scale
To perform this job activity, demonstration of this attribute is

0 Not required
1 Required to a very minimal degree
2 Required to a minimal degree
3 Required to a low moderate degree
4 Required to a moderate degree
5 Required to a high moderate degree
6 Required to a high degree
7 Required to a very high degree

ATTRIBUTES	RATING	ATTRIBUTES	RATING	ATTRIBUTES	RATING

A. Cognitive Attributes

1. Closure	0 1 2 3 4 5 6 7	
2. Form perception	0 1 2 3 4 5 6 7	
3. Perceptual speed	0 1 2 3 4 5 6 7	
4. Spatial scanning	0 1 2 3 4 5 6 7	
5. Sptial orientation	0 1 2 3 4 5 6 7	
6. Visualization	0 1 2 3 4 5 6 7	
7. Number facility	0 1 2 3 4 5 6 7	
8. Memory	0 1 2 3 4 5 6 7	
9. Verbal comprehension	0 1 2 3 4 5 6 7	
10. Grammar	0 1 2 3 4 5 6 7	
11. Spelling	0 1 2 3 4 5 6 7	
12. Expressional fluency	0 1 2 3 4 5 6 7	
13. Ideational fluency	0 1 2 3 4 5 6 7	
14. Sensitivity to problems	0 1 2 3 4 5 6 7	
15. Deductive reasoning	0 1 2 3 4 5 6 7	
16. Inductive reasoning	0 1 2 3 4 5 6 7	
17. Originality	0 1 2 3 4 5 6 7	
18. Social intelligence	0 1 2 3 4 5 6 7	
19. Aesthetic judgment	0 1 2 3 4 5 6 7	
20. Musical aptitude	0 1 2 3 4 5 6 7	

B. Psychomotor Attributes

21. Control precision	0 1 2 3 4 5 6 7	
22. Multilimb coordination	0 1 2 3 4 5 6 7	
23. Reaction time	0 1 2 3 4 5 6 7	
24. Eye-hand coordination	0 1 2 3 4 5 6 7	
25. Manual dexterity	0 1 2 3 4 5 6 7	
26. Finger dexterity	0 1 2 3 4 5 6 7	
27. Arm-hand steadiness	0 1 2 3 4 5 6 7	
28. Explosive strength	0 1 2 3 4 5 6 7	
29. Static strength	0 1 2 3 4 5 6 7	
30. Dynamic strength	0 1 2 3 4 5 6 7	
31. Body equilibrium	0 1 2 3 4 5 6 7	
32. Stamina	0 1 2 3 4 5 6 7	

C. Sensory Capacity Attributes

33. Near visual acuity	0 1 2 3 4 5 6 7	
34. Far visual acuity	0 1 2 3 4 5 6 7	
35. Depth perception	0 1 2 3 4 5 6 7	
36. Color discrimination	0 1 2 3 4 5 6 7	
37. Auditory acuity	0 1 2 3 4 5 6 7	
38. Tactual discrimination	0 1 2 3 4 5 6 7	

DEVELOPING ATTRIBUTE-BY-EXCEPTIONALITY SURVEY INSTRUMENTS

The next procedure used in relating the capabilities of the handicapped to the human attribute requirements of the job was to develop two *Attribute-by-Exceptionality Survey Instruments*. The purpose of developing these two survey instruments was twofold: (a) to have knowledgeable vocational counselors, rehabilitation counselors, specialists, and/or individuals who work directly in the counseling and/or placement of individuals with handicapping conditions at the secondary, post secondary, or sheltered workshop environment respond using their best judgment of the clients with whom they directly work regarding the capabilities of these individuals to demonstrate the thirty-eight attributes and (b) to have handicapped individuals who are students and/or clients of vocational counselors, rehabilitation counselors, specialists, and/or teachers respond using a self-assessment procedure concerning their ability to demonstrate the thirty-eight attributes. The two instruments were similar to the *Occupation-by-Attribute Survey Instrument* previously illustrated but with the following exceptions:

(a) *"requirements of demonstrating"* the attribute were changed to *"capable of demonstrating* the attribute.

(b) modification was made in the seven point rating scale to include a rating for (yes, do differ, no, do not differ) with respect to a handicapped person's ability to demonstrate a given attribute.

(c) The *Attribute-by-Exceptionality Survey Instrument* for the handicapped sample contained only the examples of the attribute activities whereas the *Attribute-by-Exceptionality Survey Instrument* for those individuals working with handicapped persons contained the attribute statements with an accompanying definition booklet.

A partial illustration of each instrument is provided in Figures 6 and 7. The complete instruments appear in Appendix D and Appendix E .

In order to clarify the narrative examples of attribute activities, each of the thirty-eight examples of attribute activities was illustrated for the handicapped person. Therefore, handicapped persons had the opportunity to determine whether or not they were capable of demonstrating the narrative example of the attribute activity or capable of demonstrating the pictorial representation of the same attribute. An illustration of a narrative activity statement and an illustration of the example of the attribute activity is presented in Figure 8. The complete illustration booklet is contained in Appendix F and is used in conjunction with the *Attribute-by-Exceptionality Survey Instrument* for handicapped persons.

Figure 6

PARTIAL ILLUSTRATION OF ATTRIBUTE-BY-EXCEPTIONALITY SURVEY INSTRUMENT FOR INDIVIDUALS WORKING WITH HANDICAPPED POPULATIONS

Rating Scale

Persons with this handicapping condition with whom you work, generally

0 are not capable of demonstrating this attribute
1 are capable of demonstrating this attribute to a very minimal degree
2 are capable of demonstrating this attribute to a minimal degree
3 are capable of demonstrating this attribute to a low moderate degree
4 are capable of demonstrating this attribute to a moderate degree
5 are capable of demonstrating this attribute to a high moderate degree
6 are capable of demonstrating this attribute to a high degree
7 are capable of demonstrating this attribute to a very high degree

Yes/No Persons with this handicapping condition (Yes, do differ - No, do not differ) from persons who are non-handicapped in the ability to demonstrate this attribute.

A. Cognitive Attribute	0 1 2 3 4 5 6 7 Y N
1. Closure	0 1 2 3 4 5 6 7 Y N
2. Form perception	0 1 2 3 4 5 6 7 Y N
3. Perceptual speed	0 1 2 3 4 5 6 7 Y N
4. Spatial scanning	0 1 2 3 4 5 6 7 Y N
5. Spatial orientation	0 1 2 3 4 5 6 7 Y N
6. Visualization	0 1 2 3 4 5 6 7 Y N
7. Number facility	0 1 2 3 4 5 6 7 Y N
8. Memory	0 1 2 3 4 5 6 7 Y N
9. Verbal comprehension	0 1 2 3 4 5 6 7 Y N
10. Grammar	0 1 2 3 4 5 6 7 Y N

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Figure 7

PARTIAL ILLUSTRATION OF ATTRIBUTE-BY-EXCEPTIONALITY SURVEY INSTRUMENT FOR HANDICAPPED POPULATIONS

Rating Scale
As an individual with a handicapping condition, I am

0 not capable of demonstrating this attribute
1 capable of demonstrating this attribute to a very minimal degree
2 capable of demonstrating this attribute to a minimal degree
3 capable of demonstrating this attribute to a low moderate degree
4 capable of demonstrating this attribute to a moderate degree
5 capable of demonstrating this attribute to a high moderate degree
6 capable of demonstrating this attribute to a high degree
7 capable of demonstrating this attribute to a very high degree

YES/NO Persons with this handicapping condition (Yes, do differ - No, do not differ) from persons non-handicapped in the ability to demonstrate this activity.

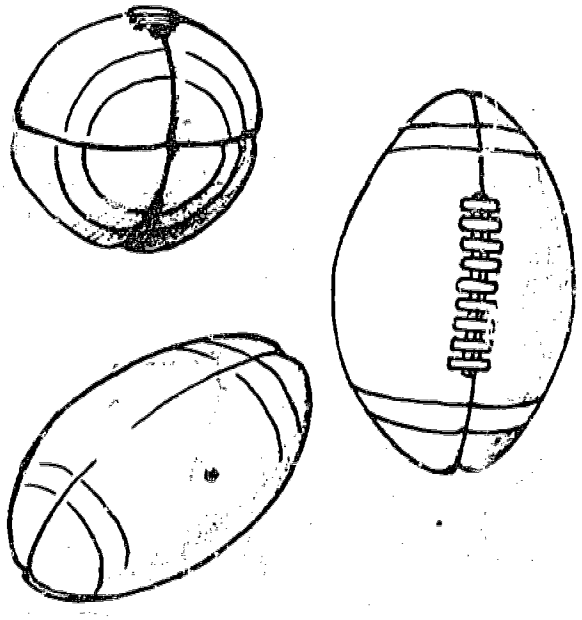
	Examples of Attribute Activities	Rating	
1	look for hidden detail in pictures; look at designs for background detail in wallpaper; solve a puzzle	0 1 2 3 4 5 6 7 Y N	*CLOSURE*
2	paint designs on surfaces; compare objects for similarities and differences; compare pictures of a landscape; paint a design on a fire hydrant	0 1 2 3 4 5 6 7 Y N	*FORM PERCEPTION*
3	check a proof against the original copy; change information from printed matter into a machine	0 1 2 3 4 5 6 7 Y N	*PERCEPTUAL SPEED*
4	look for objects on a large surface; identify quickly numbers ending in a five in a table	0 1 2 3 4 5 6 7 Y N	*SPATIAL SCANNING*
5	conduct a tour; drive a car; ride a bike; swim in an ocean; climb a mountain	0 1 2 3 4 5 6 7 Y N	*SPATIAL ORIENTATION*

Figure 8

ILLUSTRATED VERSION OF ATTRIBUTE-BY-EXCEPTIONALITY SURVEY INSTRUMENT FOR HANDICAPPED INDIVIDUALS

Example of Attribute Activities

use a mirror to place objects;
sketch designs for a pattern;
arrange furniture



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The format and structure of the *Attribute-by-Exceptionality Survey Instrument* for the handicapped population is designed for use by all areas of exceptionality. This includes use by those individuals with severely limited reading abilities. For those individuals with limited or severe visual impairments, each example of an attribute activity is read aloud to the individual responding to a self-assessment and the response is circled on an answer sheet.

With respect to the design of the *Attribute-by-Exceptionality Survey Instrument* for counselors, teachers, rehabilitation specialist, etc., at least two individuals within a given profession should have knowledge of the capability of the handicapped individual. Professional assessment should be predicted on the person's knowledge of the handicapped individual either through test scores, daily interaction, and observation of work evaluation/work adjustment situations, and other evaluation data.

Overall administration of the *Attribute-by-Exceptionality Survey Instrument* for those individuals working with a handicapped individual takes approximately twenty to thirty minutes. The self-assessment survey instrument completed by the handicapped individual takes approximately thirty to forty-five minutes depending on the nature and severity of the handicap and the individual responding.

DATA ANALYSIS AND DEVELOPING PROFILES

As indicated in the sections entitled "Developing Occupation-by-Attribute and Job Activity-by-Attribute Survey Instruments" and "Developing Attribute-by-Exceptionality Survey Instruments," the ultimate outcome of all procedures is to relate the capabilities of the handicapped to the human attribute requirements of jobs. In order to accomplish this objective, the following procedures are undertaken.

Instrument Data Analysis

In both instruments, *Occupation-by-Attribute* and *Job Activity-by- Attribute Survey Instruments*, data are analyzed by use of median scores. That is, median scores evenly divide the distribution of scores and are more amenable to extreme scores. With respect to the *Attribute-by- Exceptionality Survey Instrument*, again, median scores should be determined from the two sets of raw scores provided by those two individuals working with a handicapped individual and the raw score from the individual self-assessment rating. This single score becomes the median score for developing the profile sheets.

Profile Development

Attribute requirements are first identified by individuals employed within various occupational areas, and the capability of handicapped individuals to demonstrate the thirty-eight attributes are defined and analyzed. Then profiles can be constructed to determine the degree to which congruency can be established in relating the two by means of a comparative "*overlay*" process. These profiles represent the median ratings of the respondents from the data analysis.

Profile can be constructed for any occupational area using data from the *Occupation-by-Attribute Survey Instrument*. An illustration for three diverse occupational areas--automotive mechanic, business data programmer, and general secretary--is provided in Figure 9, 10, and 11. Profiling the attribute requirements, vis-a-vis the occupation only, provides a more holistic approach to perceived attribute requirements without differentiating between what specific job activities may be performed given certain occupational requirements relative to a particular agency, organization, or firm. In other words, there may exist certain positions within businesses, industries, or labor organizations whose requirements for a particular job do not necessarily correspond to those requirements within the Dictionary of Occupational Titles. It is necessary, therefore, to know generally what attribute requirements may be needed in order to perform tasks within a given occupation.

Figure 9

Profile of Human Attribute-by-Occupation

Occupation: Automotive Mechanic

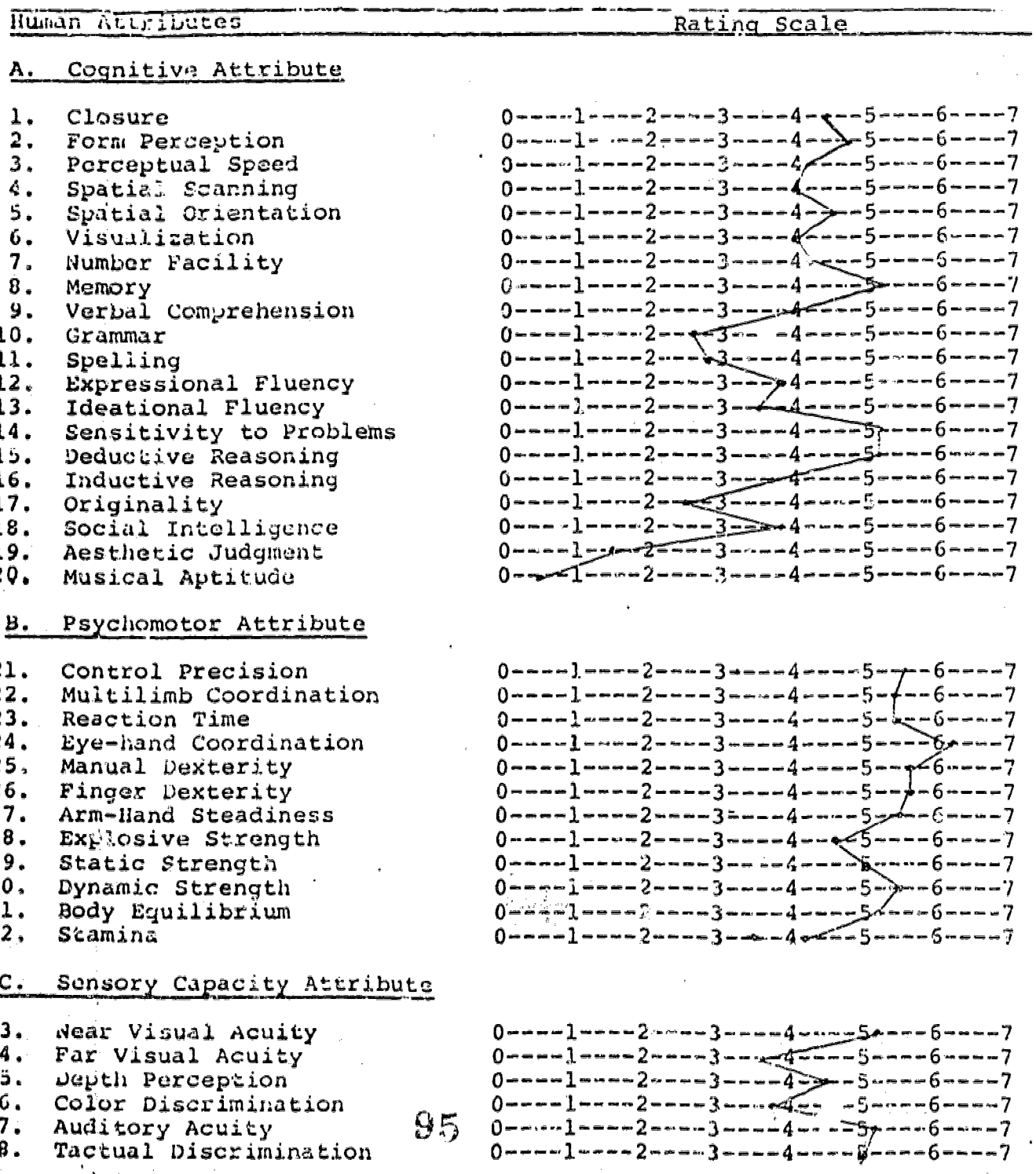


Figure 10

Profile of Human Attribute-by-Occupation

Occupation: Business Data Programmer

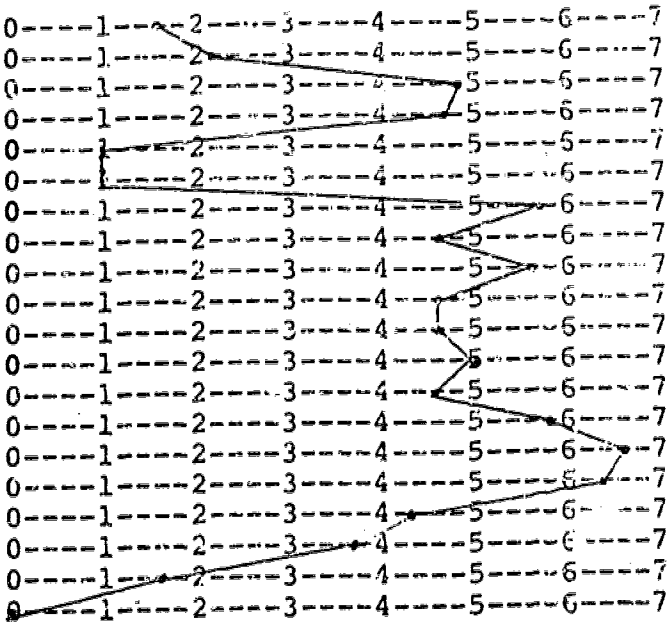
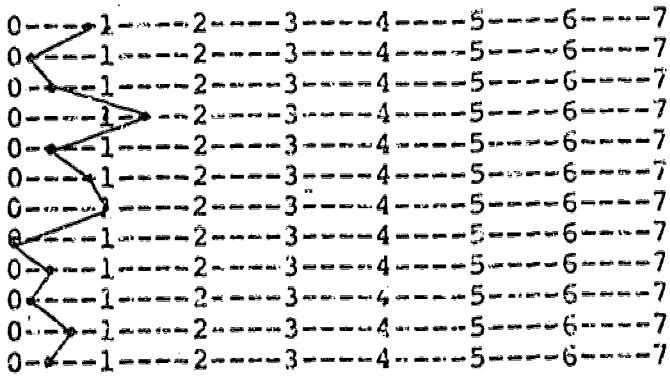
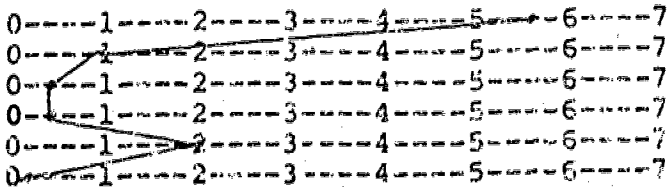
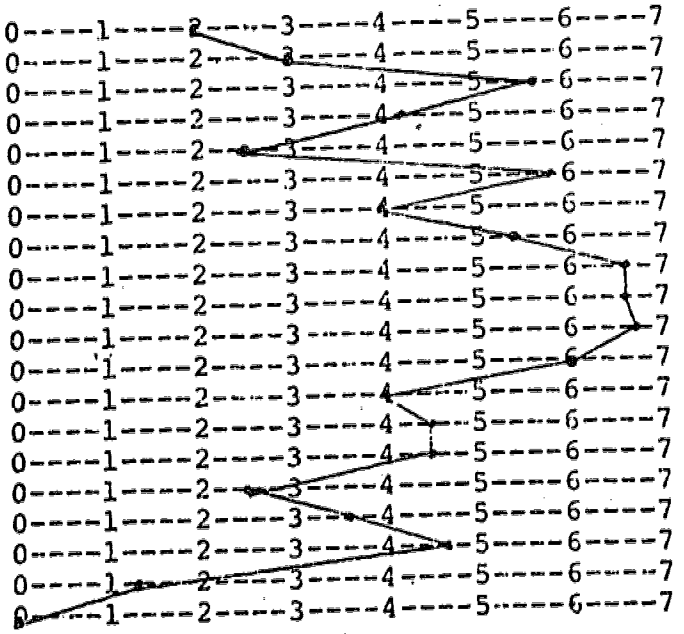
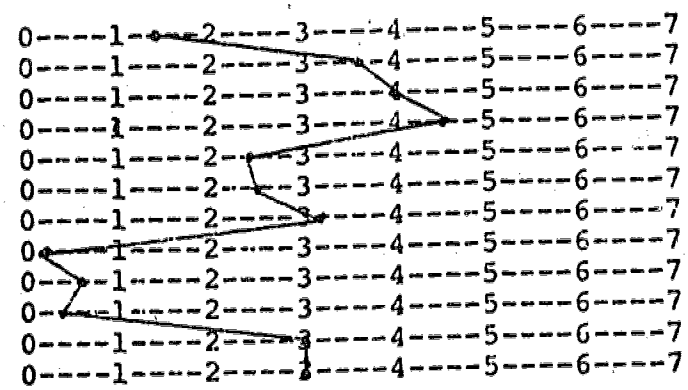
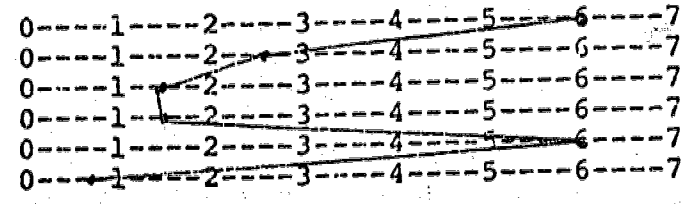
Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	
2. Form Perception	
3. Perceptual Speed	
4. Spatial Scanning	
5. Spatial Orientation	
6. Visualization	
7. Number Facility	
8. Memory	
9. Verbal Comprehension	
10. Grammar	
11. Spelling	
12. Expressional Fluency	
13. Ideational Fluency	
14. Sensitivity to Problems	
15. Deductive Reasoning	
16. Inductive Reasoning	
17. Originality	
18. Social Intelligence	
19. Aesthetic Judgment	
20. Musical Aptitude	
B. Psychomotor Attribute	
21. Control Precision	
22. Multilimb Coordination	
23. Reaction Time	
24. Eye-hand Coordination	
25. Manual Dexterity	
26. Finger Dexterity	
27. Arm-Hand Steadiness	
28. Explosive Strength	
29. Static Strength	
30. Dynamic Strength	
31. Body Equilibrium	
32. Stamina	
C. Sensory Capacity Attribute	
33. Near Visual Acuity	
34. Far Visual Acuity	
35. Depth Perception	
36. Color Discrimination	
37. Auditory Acuity	
38. Tactual Discrimination	

Figure 11

Profile of Human Attribute-by-Occupation

Occupation: General Secretary

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	
2. Form Perception	
3. Perceptual Speed	
4. Spatial Scanning	
5. Spatial Orientation	
6. Visualization	
7. Number Facility	
8. Memory	
9. Verbal Comprehension	
10. Grammar	
11. Spelling	
12. Expressional Fluency	
13. Ideational Fluency	
14. Sensitivity to Problems	
15. Deductive Reasoning	
16. Inductive Reasoning	
17. Originality	
18. Social Intelligence	
19. Aesthetic Judgment	
20. Musical Aptitude	
B. Psychomotor Attribute	
21. Control Precision	
22. Multilimb Coordination	
23. Reaction Time	
24. Eye-hand Coordination	
25. Manual Dexterity	
26. Finger Dexterity	
27. Arm-Hand Steadiness	
28. Explosive Strength	
29. Static Strength	
30. Dynamic Strength	
31. Body Equilibrium	
32. Stamina	
C. Sensory Capacity Attribute	
33. Near Visual Acuity	
34. Far Visual Acuity	
35. Depth Perception	
36. Color Discrimination	
37. Auditory Acuity	
38. Tactual Discrimination	

Next, profiles are constructed for the job activities within the occupation. That , again using the median scores from the data analysis of the *Job Activity-by-Attribute rvey Instrument*, each job activity within an occupation can be constructed. For lustration purposes only, Figures 12, 13, and 14 provide an example of profiles from ree occupational areas: automotive mechanic, general secretary, and business data ogrammer. Job Activity-by-Attribute profiles provide a more comprehensive understanding attribute requirements across specific job activities within an occupation. Addi-onally, within the "*overlay*" procedure, it can be easily discerned what attributes are eded within specific activities and it can be determined what congruency can be estab-shed between the attributes required by the occupations in general and those needed for rticular job activities within the occupations. Complete Job Activity-by-Attribute ofiles for each of three occupations, general secretary, automotive mechanic, and siness data programmer appear in Appendix G, H, and I.

The final procedure is to construct the profiles for the handicapped population. e same procedure is employed to develop these profiles as is used in developing the cupation-by-Attribute and Job Activity-by-Attribute profiles. That is, obtain the raw ores from the sample population surveyed and profile the median scores. These profiled ores are then "*overlayed*" either on the Occupation-by-Attribute profile or on the Job-tivity-by-Attribute profiles. As indicated, the Occupation-by-Attriture profile provides

Figure 12

Profile of Human Attributes for Job Activities

Occupation: Automotive Mechanic

Job Activity:

Examine vehicle and discuss with customer or automobile-repair-service salesman, automobile tester, etc., nature and extent of damage or malfunction.

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	0----1----2----3----4----5----6----7
2. Form Perception	0----1----2----3----4----5----6----7
3. Perceptual Speed	0----1----2----3----4----5----6----7
4. Spatial Scanning	0----1----2----3----4----5----6----7
5. Spatial Orientation	0----1----2----3----4----5----6----7
6. Visualization	0----1----2----3----4----5----6----7
7. Number Facility	0----1----2----3----4----5----6----7
8. Memory	0----1----2----3----4----5----6----7
9. Verbal Comprehension	0----1----2----3----4----5----6----7
10. Grammar	0----1----2----3----4----5----6----7
11. Spelling	0----1----2----3----4----5----6----7
12. Expressional Fluency	0----1----2----3----4----5----6----7
13. Ideational Fluency	0----1----2----3----4----5----6----7
14. Sensitivity to Problems	0----1----2----3----4----5----6----7
15. Deductive Reasoning	0----1----2----3----4----5----6----7
16. Inductive Reasoning	0----1----2----3----4----5----6----7
17. Originality	0----1----2----3----4----5----6----7
18. Social Intelligence	0----1----2----3----4----5----6----7
19. Aesthetic Judgment	0----1----2----3----4----5----6----7
20. Musical Aptitude	0----1----2----3----4----5----6----7
B. Psychomotor Attribute	
21. Control Precision	0----1----2----3----4----5----6----7
22. Multilimb Coordination	0----1----2----3----4----5----6----7
23. Reaction Time	0----1----2----3----4----5----6----7
24. Eye-hand Coordination	0----1----2----3----4----5----6----7
25. Manual Dexterity	0----1----2----3----4----5----6----7
26. Finger Dexterity	0----1----2----3----4----5----6----7
27. Arm-Hand Steadiness	0----1----2----3----4----5----6----7
28. Explosive Strength	0----1----2----3----4----5----6----7
29. Static Strength	0----1----2----3----4----5----6----7
30. Dynamic Strength	0----1----2----3----4----5----6----7
31. Body Equilibrium	0----1----2----3----4----5----6----7
32. Stamina	0----1----2----3----4----5----6----7
C. Sensory Capacity Attribute	
33. Near Visual Acuity	0----1----2----3----4----5----6----7
34. Far Visual Acuity	0----1----2----3----4----5----6----7
35. [illegible]eption	0----1----2----3----4----5----6----7
36. [illegible]crimination	0----1----2----3----4----5----6----7
37. Auditory Acuity	0----1----2----3----4----5----6----7
38. Tactual Discrimination	0----1----2----3----4----5----6----7

Figure 13

Profile of Human Attributes for Job Activities

Occupation: General Secretary

Job Activity:

Read and route incoming mail.

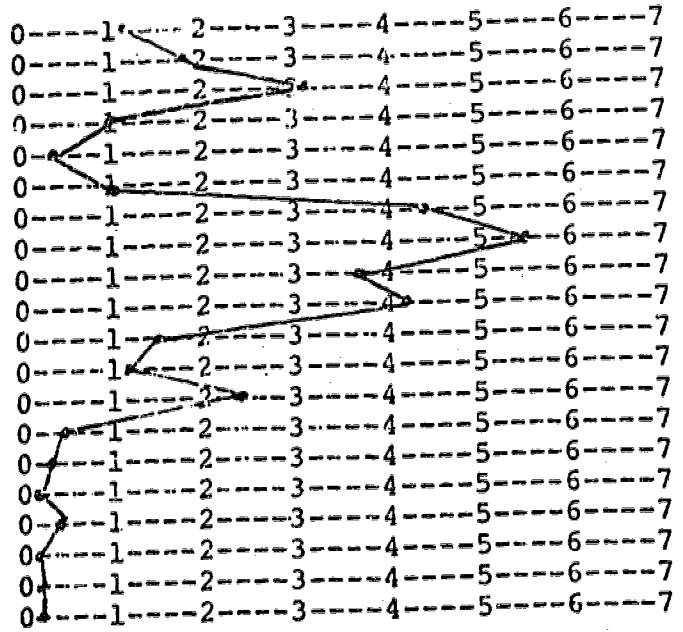
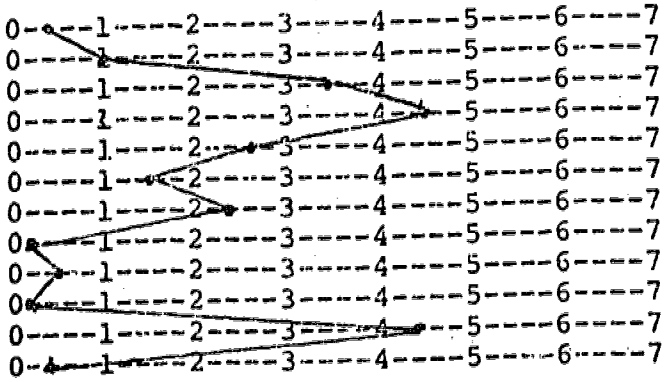
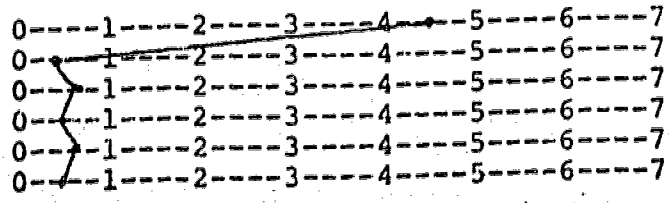
Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	
2. Form Perception	
3. Perceptual Speed	
4. Spatial Scanning	
5. Spatial Orientation	
6. Visualization	
7. Number Facility	
8. Memory	
9. Verbal Comprehension	
10. Grammar	
11. Spelling	
12. Expressional Fluency	
13. Ideational Fluency	
14. Sensitivity to Problems	
15. Deductive Reasoning	
16. Inductive Reasoning	
17. Originality	
18. Social Intelligence	
19. Aesthetic Judgment	
20. Musical Aptitude	
B. Psychomotor Attribute	
21. Control Precision	
22. Multilimb Coordination	
23. Reaction Time	
24. Eye-hand Coordination	
25. Manual Dexterity	
26. Finger Dexterity	
27. Arm-Hand Steadiness	
28. Explosive Strength	
29. Static Strength	
30. Dynamic Strength	
31. Body Equilibrium	
32. Stamina	
C. Sensory Capacity Attribute	
33. Near Visual Acuity	
34. Far Visual Acuity	
35. Depth Perception	
36. Color Discrimination	
37. Auditory Acuity	
38. Tactual Discrimination	

Figure 14

Profile of Human Attributes for Job Activities

Occupation: Business Data Programmer

Job Activity:

Analyze all or part of workflow chart or diagram representing business problem by applying knowledge of computer capabilities, subject matter, algebra, and symbolic logic to develop sequence of program steps.

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	0----1----2----3----4----5----6----7
2. Form Perception	0----1----2----3----4----5----6----7
3. Perceptual Speed	0----1----2----3----4----5----6----7
4. Spatial Scanning	0----1----2----3----4----5----6----7
5. Spatial Orientation	0----1----2----3----4----5----6----7
6. Visualization	0----1----2----3----4----5----6----7
7. Number Facility	0----1----2----3----4----5----6----7
8. Memory	0----1----2----3----4----5----6----7
9. Verbal Comprehension	0----1----2----3----4----5----6----7
10. Grammar	0----1----2----3----4----5----6----7
11. Spelling	0----1----2----3----4----5----6----7
12. Expressional Fluency	0----1----2----3----4----5----6----7
13. Ideational Fluency	0----1----2----3----4----5----6----7
14. Sensitivity to Problems	0----1----2----3----4----5----6----7
15. Deductive Reasoning	0----1----2----3----4----5----6----7
16. Inductive Reasoning	0----1----2----3----4----5----6----7
17. Originality	0----1----2----3----4----5----6----7
18. Social Intelligence	0----1----2----3----4----5----6----7
19. Aesthetic Judgment	0----1----2----3----4----5----6----7
20. Musical Aptitude	0----1----2----3----4----5----6----7
B. Psychomotor Attribute	
21. Control Precision	0----1----2----3----4----5----
22. Multilimb Coordination	0----1----2----3----4----5----
23. Reaction Time	0----1----2----3----4----5----6----7
24. Eye-hand Coordination	0----1----2----3----4----5----6----7
25. Manual Dexterity	0----1----2----3----4----5----6----7
26. Finger Dexterity	0----1----2----3----4----5----6----7
27. Arm-Hand Steadiness	0----1----2----3----4----5----6----7
28. Explosive Strength	0----1----2----3----4----5----6----7
29. Static Strength	0----1----2----3----4----5----6----7
30. Dynamic Strength	0----1----2----3----4----5----6----7
31. Body Equilibrium	0----1----2----3----4----5----6----7
32. Stamina	0----1----2----3----4----5----6----7
C. Sensory Capacity Attribute	
33. Near Visual Acuity	0----1----2----3----4----5----6----7
34. Far Visual Acuity	0----1----2----3----4----5----6----7
35. Depth Perception	0----1----2----3----4----5----6----7
36. Color Discrimination	0----1----2----3----4----5----6----7
37. Auditory Acuity	0----1----2----3----4----5----6----7
38. Tactual Discrimination	0----1----2----3----4----5----6----7

information on occupational requirements at a gross level, whereas the Job-Activity-by-Attribute profile provides information on occupational requirements at a specific level.

In order to make a comparison of a handicapped person's ability to demonstrate attribute requirements at either the gross or finite level, a particular handicapped person's profile is "*overlayed*" on either one of the two profiles. When "*overlayed*" on the Occupation-by-Attribute profile, it represents attribute requirements irrespective of the job activities within the occupation. When "*overlayed*" on the Job-Activity-by-Attribute profiles, it represents attribute requirements for specific job activities within the entire occupation.

An illustration is provided in Figures 15 through 23 for nine areas of exceptionality and include blind, partially sighted, deaf, hard of hearing, emotionally disturbed, mentally retarded, speech impaired, nonsensory physical, and learning disabled. These categories were based on the Bureau of Education for the Handicapped, Office of Education classification and represent those areas of exceptionality used in the field testing of the instruments. The profiles presented in Figures 15 through 23 are illustrations of the profiles of individual respondents used in the field test procedures. Profiles, of course, will vary depending on the population and the area of exceptionality.

FIGURE 15

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Blind

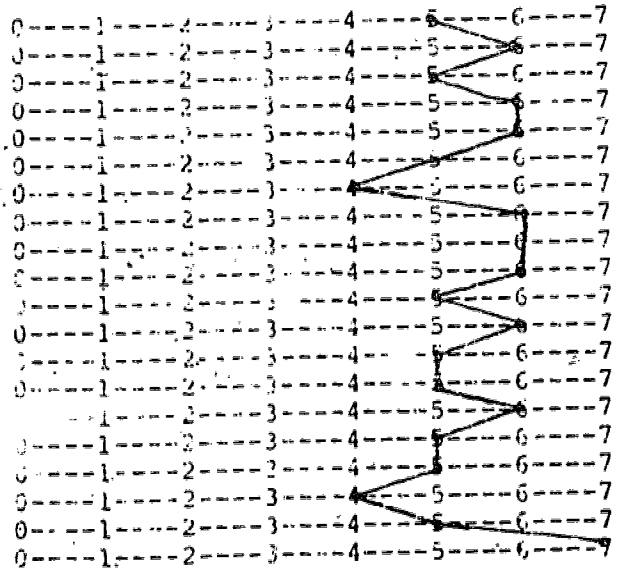
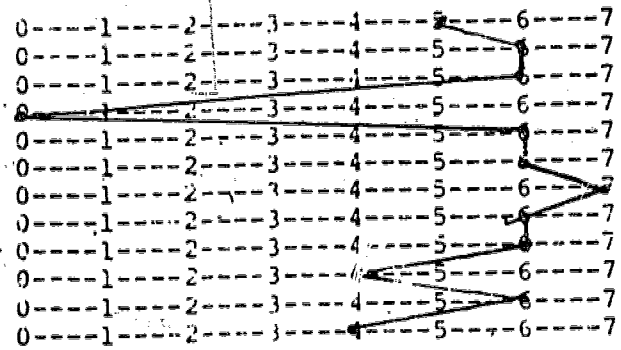
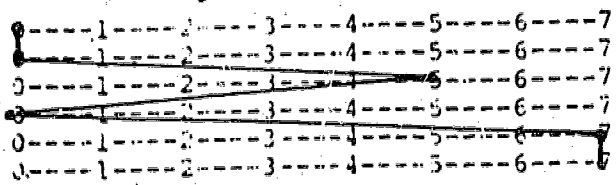
Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	
2. Form Perception	
3. Perceptual Speed	
4. Spatial Scanning	
5. Spatial Orientation	
6. Visualization	
7. Number Facility	
8. Memory	
9. Verbal Comprehension	
10. Grammar	
11. Spelling	
12. Expressional Fluency	
13. Ideational Fluency	
14. Sensitivity to Problems	
15. Deductive Reasoning	
16. Inductive Reasoning	
17. Originality	
18. Social Intelligence	
19. Aesthetic Judgment	
20. Musical Aptitude	
B. Psychomotor Attribute	
21. Control Precision	
22. Multilimb Coordination	
23. Reaction Time	
24. Eye-hand Coordination	
25. Manual Dexterity	
26. Finger Dexterity	
27. Arm-Hand Steadiness	
28. Explosive Strength	
29. Static Strength	
30. Dynamic Strength	
31. Body Equilibrium	
32. Stamina	
C. Sensory Capacity Attribute	
33. Near Visual Acuity	
34. Far Visual Acuity	
35. Depth Perception	
36. Color Discrimination	
37. Auditory Acuity	
38. Tactual Discrimination	

FIGURE 16

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Partially Sighted

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	0----1----2----3----4----5----6----7
2. Form Perception	0----1----2----3----4----5----6----7
3. Perceptual Speed	0----1----2----3----4----5----6----7
4. Spatial Scanning	0----1----2----3----4----5----6----7
5. Spatial Orientation	0----1----2----3----4----5----6----7
6. Visualization	0----1----2----3----4----5----6----7
7. Number Facility	0----1----2----3----4----5----6----7
8. Memory	0----1----2----3----4----5----6----7
9. Verbal Comprehension	0----1----2----3----4----5----6----7
10. Grammar	0----1----2----3----4----5----6----7
11. Spelling	0----1----2----3----4----5----6----7
12. Expressional Fluency	0----1----2----3----4----5----6----7
13. Ideational Fluency	0----1----2----3----4----5----6----7
14. Sensitivity to Problems	0----1----2----3----4----5----6----7
15. Deductive Reasoning	0----1----2----3----4----5----6----7
16. Inductive Reasoning	0----1----2----3----4----5----6----7
17. Originality	0----1----2----3----4----5----6----7
18. Social Intelligence	0----1----2----3----4----5----6----7
19. Aesthetic Judgment	0----1----2----3----4----5----6----7
20. Musical Aptitude	0----1----2----3----4----5----6----7
B. Psychomotor Attribute	
21. Control Precision	0----1----2----3----4----5----6----7
22. Multilimb Coordination	0----1----2----3----4----5----6----7
23. Reaction Time	0----1----2----3----4----5----6----7
24. Eye-hand Coordination	0----1----2----3----4----5----6----7
25. Manual Dexterity	0----1----2----3----4----5----6----7
26. Finger Dexterity	0----1----2----3----4----5----6----7
27. Arm-Hand Steadiness	0----1----2----3----4----5----6----7
28. Explosive Strength	0----1----2----3----4----5----6----7
29. Static Strength	0----1----2----3----4----5----6----7
30. Dynamic Strength	0----1----2----3----4----5----6----7
31. Body Equilibrium	0----1----2----3----4----5----6----7
32. Stamina	0----1----2----3----4----5----6----7
C. Sensory Capacity Attribute	
33. Near Visual Acuity	0----1----2----3----4----5----6----7
34. Far Visual Acuity	0----1----2----3----4----5----6----7
35. Depth Perception	0----1----2----3----4----5----6----7
36. Color Discrimination	0----1----2----3----4----5----6----7
37. Auditory Acuity	0----1----2----3----4----5----6----7
38. Tactual Discrimination	0----1----2----3----4----5----6----7

FIGURE 17

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Deaf

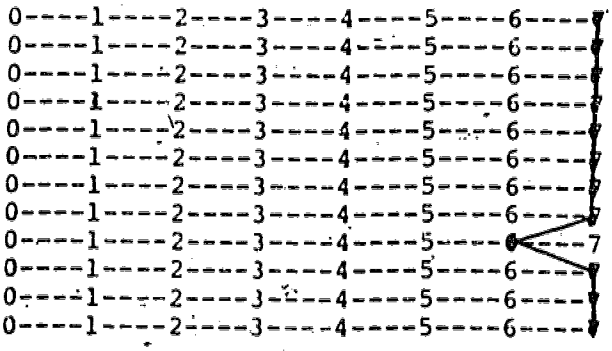
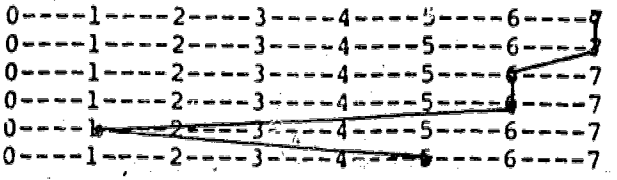
Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	
2. Form Perception	
3. Perceptual Speed	
4. Spatial Scanning	
5. Spatial Orientation	
6. Visualization	
7. Number Facility	
8. Memory	
9. Verbal Comprehension	
10. Grammar	
11. Spelling	
12. Expressional Fluency	
13. Ideational Fluency	
14. Sensitivity to Problems	
15. Deductive Reasoning	
16. Inductive Reasoning	
17. Originality	
18. Social Intelligence	
19. Aesthetic Judgment	
20. Musical Aptitude	
B. Psychomotor Attribute	
21. Control Precision	
22. Multilimb Coordination	
23. Reaction Time	
24. Eye-hand Coordination	
25. Manual Dexterity	
26. Finger Dexterity	
27. Arm-Hand Steadiness	
28. Explosive Strength	
29. Static Strength	
30. Dynamic Strength	
31. Body Equilibrium	
32. Stamina	
C. Sensory Capacity Attribute	
33. Near Visual Acuity	
34. Far Visual Acuity	
35. Depth Perception	
36. Color Discrimination	
37. Auditory Acuity	
38. Tactual Discrimination	

FIGURE 18

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Hard of Hearing

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	0----1----2----3----4----5----6----7
2. Form Perception	0----1----2----3----4----5----6----7
3. Perceptual Speed	0----1----2----3----4----5----6----7
4. Spatial Scanning	0----1----2----3----4----5----6----7
5. Spatial Orientation	0----1----2----3----4----5----6----7
6. Visualization	0----1----2----3----4----5----6----7
7. Number Facility	0----1----2----3----4----5----6----7
8. Memory	0----1----2----3----4----5----6----7
9. Verbal Comprehension	0----1----2----3----4----5----6----7
10. Grammar	0----1----2----3----4----5----6----7
11. Spelling	0----1----2----3----4----5----6----7
12. Expressional Fluency	0----1----2----3----4----5----6----7
13. Ideational Fluency	0----1----2----3----4----5----6----7
14. Sensitivity to Problems	0----1----2----3----4----5----6----7
15. Deductive Reasoning	0----1----2----3----4----5----6----7
16. Inductive Reasoning	0----1----2----3----4----5----6----7
17. Originality	0----1----2----3----4----5----6----7
18. Social Intelligence	0----1----2----3----4----5----6----7
19. Aesthetic Judgment	0----1----2----3----4----5----6----7
20. Musical Aptitude	0----1----2----3----4----5----6----7
B. Psychomotor Attribute	
21. Control Precision	0----1----2----3----4----5----6----7
22. Multilimb Coordination	0----1----2----3----4----5----6----7
23. Reaction Time	0----1----2----3----4----5----6----7
24. Eye-hand Coordination	0----1----2----3----4----5----6----7
25. Manual Dexterity	0----1----2----3----4----5----6----7
26. Finger Dexterity	0----1----2----3----4----5----6----7
27. Arm-Hand Steadiness	0----1----2----3----4----5----6----7
28. Explosive Strength	0----1----2----3----4----5----6----7
29. Static Strength	0----1----2----3----4----5----6----7
30. Dynamic Strength	0----1----2----3----4----5----6----7
31. Body Equilibrium	0----1----2----3----4----5----6----7
32. Stamina	0----1----2----3----4----5----6----7
C. Sensory Capacity Attribute	
33. Near Visual Acuity	0----1----2----3----4----5----6----7
34. Far Visual Acuity	0----1----2----3----4----5----6----7
35. Depth Perception	0----1----2----3----4----5----6----7
36. Color Discrimination	0----1----2----3----4----5----6----7
37. Auditory Acuity	0----1----2----3----4----5----6----7
38. Tactual Discrimination	0----1----2----3----4----5----6----7

FIGURE 19

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Emotionally Disturbed

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	0----1----2----3----4----5----6----7
2. Form Perception	0----1----2----3----4----5----6----7
3. Perceptual Speed	0----1----2----3----4----5----6----7
4. Spatial Scanning	0----1----2----3----4----5----6----7
5. Spatial Orientation	0----1----2----3----4----5----6----7
6. Visualization	0----1----2----3----4----5----6----7
7. Number Facility	0----1----2----3----4----5----6----7
8. Memory	0----1----2----3----4----5----6----7
9. Verbal Comprehension	0----1----2----3----4----5----6----7
10. Grammar	0----1----2----3----4----5----6----7
11. Spelling	0----1----2----3----4----5----6----7
12. Expressional Fluency	0----1----2----3----4----5----6----7
13. Ideational Fluency	0----1----2----3----4----5----6----7
14. Sensitivity to Problems	0----1----2----3----4----5----6----7
15. Deductive Reasoning	0----1----2----3----4----5----6----7
16. Inductive Reasoning	0----1----2----3----4----5----6----7
17. Originality	0----1----2----3----4----5----6----7
18. Social Intelligence	0----1----2----3----4----5----6----7
19. Aesthetic Judgment	0----1----2----3----4----5----6----7
20. Musical Aptitude	0----1----2----3----4----5----6----7
B. Psychomotor Attribute	
21. Control Precision	0----1----2----3----4----5----6----7
22. Multilimb Coordination	0----1----2----3----4----5----6----7
23. Reaction Time	0----1----2----3----4----5----6----7
24. Eye-hand Coordination	0----1----2----3----4----5----6----7
25. Manual Dexterity	0----1----2----3----4----5----6----7
26. Finger Dexterity	0----1----2----3----4----5----6----7
27. Arm-Hand Steadiness	0----1----2----3----4----5----6----7
28. Explosive Strength	0----1----2----3----4----5----6----7
29. Static Strength	0----1----2----3----4----5----6----7
30. Dynamic Strength	0----1----2----3----4----5----6----7
31. Body Equilibrium	0----1----2----3----4----5----6----7
32. Stamina	0----1----2----3----4----5----6----7
C. Sensory Capacity Attribute	
33. Near Visual Acuity	0----1----2----3----4----5----6----7
34. Far Visual Acuity	0----1----2----3----4----5----6----7
35. Depth Perception	0----1----2----3----4----5----6----7
36. Color Discrimination	0----1----2----3----4----5----6----7
37. Auditory Acuity	0----1----2----3----4----5----6----7
38. Tactual Discrimination	0----1----2----3----4----5----6----7

FIGURE 20

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Mentally Retarded

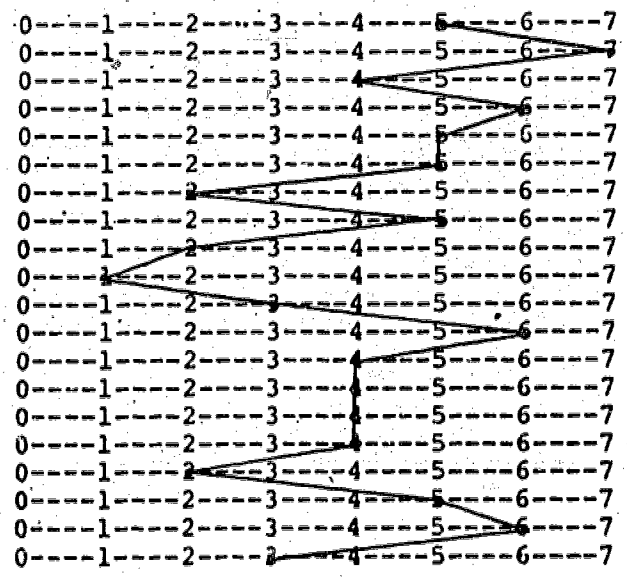
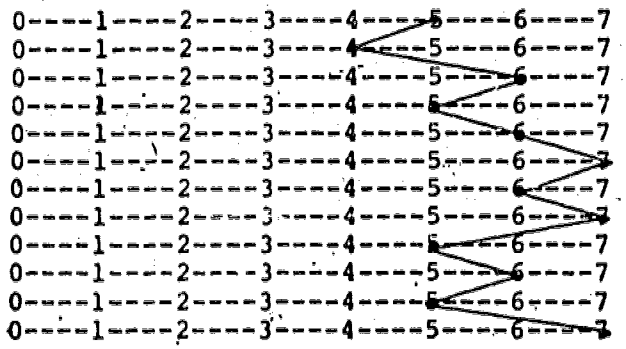
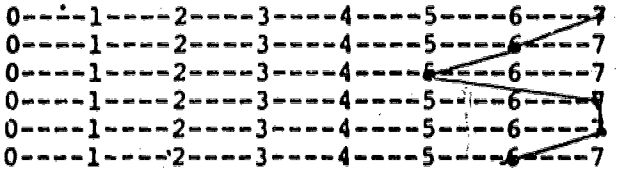
Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	
2. Form Perception	
3. Perceptual Speed	
4. Spatial Scanning	
5. Spatial Orientation	
6. Visualization	
7. Number Facility	
8. Memory	
9. Verbal Comprehension	
10. Grammar	
11. Spelling	
12. Expressional Fluency	
13. Ideational Fluency	
14. Sensitivity to Problems	
15. Deductive Reasoning	
16. Inductive Reasoning	
17. Originality	
18. Social Intelligence	
19. Aesthetic Judgment	
20. Musical Aptitude	
B. Psychomotor Attribute	
21. Control Precision	
22. Multilimb Coordination	
23. Reaction Time	
24. Eye-hand Coordination	
25. Manual Dexterity	
26. Finger Dexterity	
27. Arm-Hand Steadiness	
28. Explosive Strength	
29. Static Strength	
30. Dynamic Strength	
31. Body Equilibrium	
32. Stamina	
C. Sensory Capacity Attribute	
33. Near Visual Acuity	
34. Far Visual Acuity	
35. Depth Perception	
36. Color Discrimination	
37. Auditory Acuity	
38. Tactual Discrimination	

FIGURE 21

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Speech Impairment

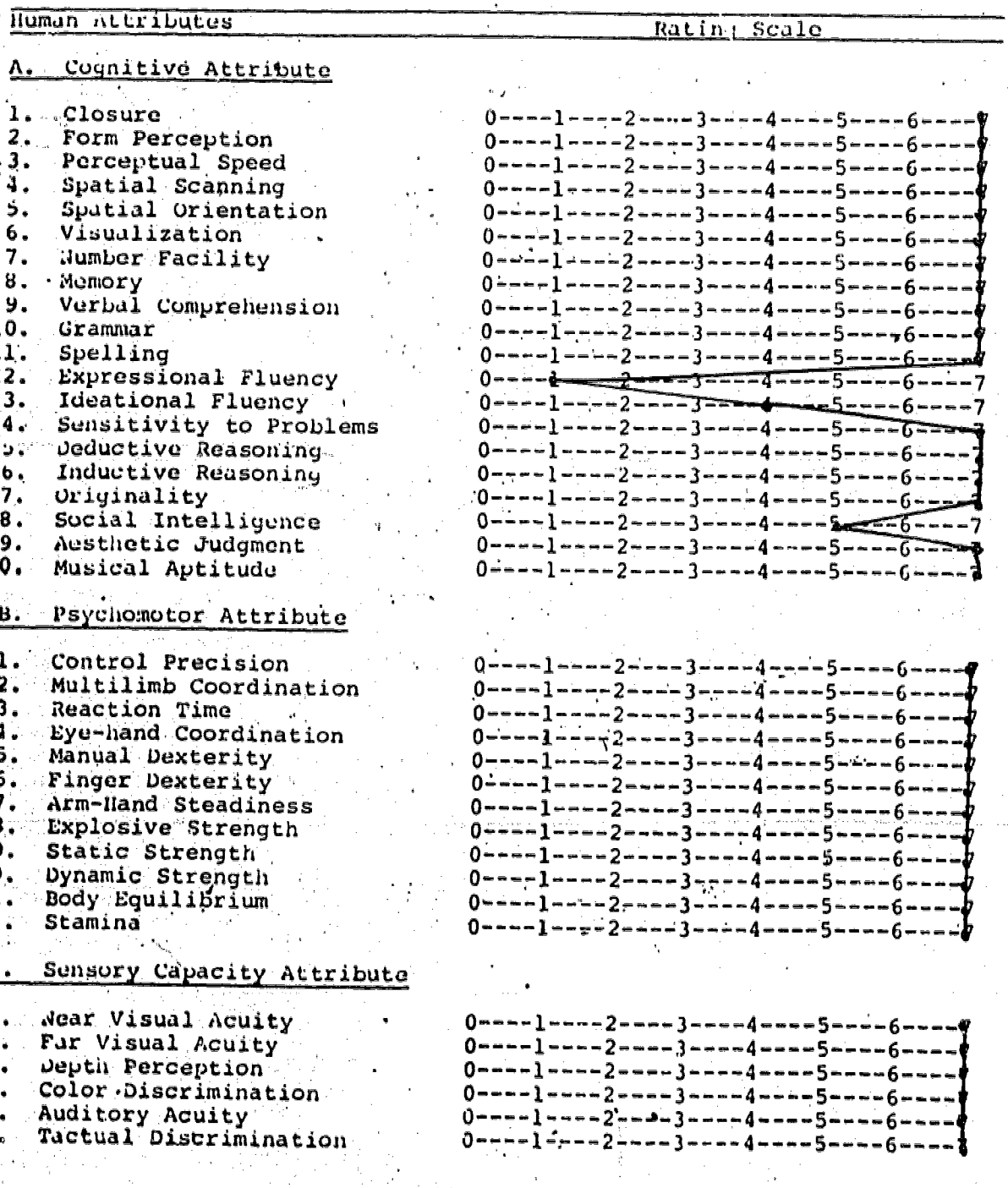


FIGURE 22

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Non Sensory Physical

Human Attributes	Rating Scale
A. Cognitive Attribute	
1. Closure	0----1----2----3----4----5----6----7
2. Form Perception	0----1----2----3----4----5----6----7
3. Perceptual Speed	0----1----2----3----4----5----6----7
4. Spatial Scanning	0----1----2----3----4----5----6----7
5. Spatial Orientation	0----1----2----3----4----5----6----7
6. Visualization	0----1----2----3----4----5----6----7
7. Number Facility	0----1----2----3----4----5----6----7
8. Memory	0----1----2----3----4----5----6----7
9. Verbal Comprehension	0----1----2----3----4----5----6----7
10. Grammar	0----1----2----3----4----5----6----7
11. Spelling	0----1----2----3----4----5----6----7
12. Expressional Fluency	0----1----2----3----4----5----6----7
13. Ideational Fluency	0----1----2----3----4----5----6----7
14. Sensitivity to Problems	0----1----2----3----4----5----6----7
15. Deductive Reasoning	0----1----2----3----4----5----6----7
16. Inductive Reasoning	0----1----2----3----4----5----6----7
17. Originality	0----1----2----3----4----5----6----7
18. Social Intelligence	0----1----2----3----4----5----6----7
19. Aesthetic Judgment	0----1----2----3----4----5----6----7
20. Musical Aptitude	0----1----2----3----4----5----6----7
B. Psychomotor Attribute	
21. Control Precision	0----1----2----3----4----5----6----7
22. Multilimb Coordination	0----1----2----3----4----5----6----7
23. Reaction Time	0----1----2----3----4----5----6----7
24. Eye-hand Coordination	0----1----2----3----4----5----6----7
25. Manual Dexterity	0----1----2----3----4----5----6----7
26. Finger Dexterity	0----1----2----3----4----5----6----7
27. Arm-Hand Steadiness	0----1----2----3----4----5----6----7
28. Explosive Strength	0----1----2----3----4----5----6----7
29. Static Strength	0----1----2----3----4----5----6----7
30. Dynamic Strength	0----1----2----3----4----5----6----7
31. Body Equilibrium	0----1----2----3----4----5----6----7
32. Stamina	0----1----2----3----4----5----6----7
C. Sensory Capacity Attribute	
33. Near Visual Acuity	0----1----2----3----4----5----6----7
34. Far Visual Acuity	0----1----2----3----4----5----6----7
35. Depth Perception	0----1----2----3----4----5----6----7
36. Color Discrimination	0----1----2----3----4----5----6----7
37. Auditory Acuity	0----1----2----3----4----5----6----7
38. Tactual Discrimination	0----1----2----3----4----5----6----7

FIGURE 23

MEDIAN PROFILE OF ATTRIBUTE-BY-EXCEPTIONALITY

INDIVIDUAL RESPONDENT

Handicapping Condition: Learning Disabled